

***Molineus barbatus* (Trichostrongylidae) and other Helminthic Infections of the Cat in Arkansas**

W. L. SHOOP, H. W. HAINES, B. F. MICHAEL, C. H. EARY, AND R. G. ENDRIS
Merck Institute for Therapeutic Research, New Jersey 07065

ABSTRACT: During anthelmintic studies on naturally infected cats in Arkansas, we encountered a species never before reported from cats among a 10-species helminthic assemblage in 13 untreated, control animals. The helminthic assemblage included the following: 1 trematode, *Eurytrema procyonis* in 8% of the cats; 3 cestodes, *Dipylidium caninum*, *Mesocestoides variabilis*, and *Taenia* sp. in 8%, 15%, and 8% of the cats, respectively; and 6 nematodes, *Ancylostoma tubaeforme*, *Capillaria* sp., *Molineus barbatus*, *Physaloptera rara*, *Toxascaris leonina*, and *Toxocara cati* in 77%, 62%, 54%, 38%, 8%, and 92% of the cats, respectively. To our knowledge, this is the first report of the trichostrongylid, *M. barbatus*, from domestic cats. Adult worms were found in 7 of 13 animals with a maximum intensity of 21 worms. It is significant to note that fecal analysis made prior to necropsy failed to reveal trichostrongyle eggs in any of the cats. Given the similarity of *M. barbatus* eggs to hookworm eggs in shape (both are thin-shelled and elliptical) and size (both are 60 × 40 μm), it is possible that we mistook *M. barbatus* eggs for those of hookworms. It is also possible that practitioners could make the same mistake resulting in animals treated for hookworm infections that they may not have.

KEY WORDS: *Ancylostoma tubaeforme*, *Capillaria* sp., cats, *Dipylidium caninum*, *Eurytrema procyonis*, helminths, *Mesocestoides variabilis*, *Molineus barbatus*, *Physaloptera rara*, *Taenia* sp., *Toxascaris leonina*, *Toxocara cati*.

Recently we conducted anthelmintic trials on naturally infected cats in Arkansas. Of the 50 cats involved in the studies, 13 remained as untreated controls. Within those untreated control animals we encountered a helminthic assemblage that comprised 10 species; 1 that appeared commonly had never been reported from the cat.

Materials and Methods

In preparation for anthelmintic trials, 50, mixed-breed, sexually mature cats from the Conway, Arkansas area underwent fecal examination during 1989 and 1990 for the presence of natural infections of intestinal helminths. Fecal exams consisted of coverslip flotations using magnesium-sulfate. Eggs of hookworms, ascarids, capillarids, physalopterans, and tapeworms were observed (Table 1). Based on the presence and number of eggs, the 50 cats were allocated to treatment groups such that each group had an equal representation of parasite species and number of worms (or as close to equality as possible for quantitative fecal analysis). Of the 50 cats, 13 were allocated to controls and remained untreated. Table 1 demonstrates that the 13 cats left untreated were a representative subsample of the 50-cat population. The data from animals allocated to the treatment groups were excluded from this report. At necropsy, the entire gastrointestinal tract from each control cat was removed, slit longitudinally, and the mucosa washed over a 200-mesh screen (pore size 75 μm). The contents collected from that screen were placed in formalin. The gastrointestinal tracts were then incubated individually overnight in saline and Combiotic (Pfizer) at room temperature. The next day they again were washed and the sievings fixed in the same manner as previously described. The formalin-pre-

served contents from the 2 washings were examined microscopically and total residual worm counts were made.

Results

Ten species of helminths were found in the 13 control animals at necropsy and are presented in Table 2. Adults of *Molineus barbatus* Chandler, 1942 (Figs. 1–4), were found in 7 of the 13 cats. It is important to note that eggs recognizable as belonging to a trichostrongylid were not distinguished at any time during the fecal analysis.

Table 1. Prevalence of helminths in Arkansas cats as evidenced from fecal exams.

Species	Prevalence	
	Entire 50 animal group	Control group aliquot
<i>Ancylostoma tubaeforme</i>	72% (36/50)	77% (10/13)
<i>Capillaria</i> sp.	22% (11/50)	23% (3/13)
<i>Dipylidium caninum</i>	0% (0/50)	0% (0/13)
<i>Eurytrema procyonis</i>	0% (0/50)	0% (0/13)
<i>Mesocestoides variabilis</i>	0% (0/50)	0% (0/13)
<i>Molineus barbatus</i>	0% (0/50)	0% (0/13)
<i>Physaloptera rara</i>	2% (1/50)	0% (0/13)
<i>Taenia</i> sp.	8% (4/50)	8% (1/13)
<i>Toxascaris leonina</i>	0% (0/50)	0% (0/13)
<i>Toxocara cati</i>	48% (24/50)	54% (7/13)

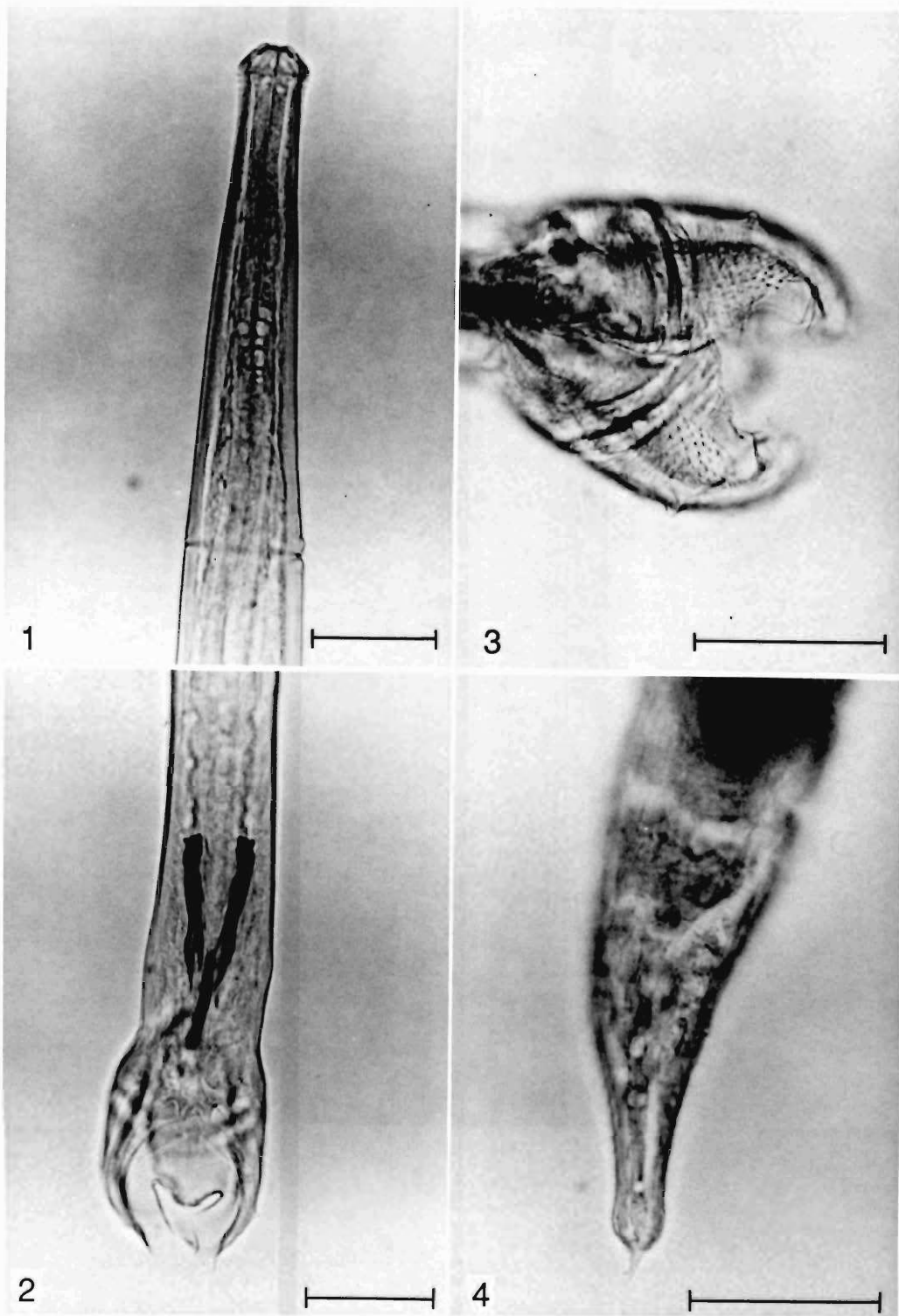


Table 2. Prevalence and intensity of helminths in Arkansas cats after necropsy.

Species	USNM Helminth Collection Number	Prevalence	Intensity
<i>Ancylostoma tubaeforme</i>	81875	77% (10/13)	17 (0–100)
<i>Capillaria</i> sp.	81876	62% (8/13)	6 (0–27)
<i>Dipylidium caninum</i>	81877	8% (1/13)	<1 (0–1)
<i>Eurytrema procyonis</i>	81878	8% (1/13)	<1 (0–1)
<i>Mesocostoides variabilis</i>	81879	15% (2/13)	<1 (0–3)
<i>Molineus barbatus</i>	81880	54% (7/13)	4 (0–21)
<i>Physaloptera rara</i>	81881	38% (5/13)	4 (0–27)
<i>P. rara</i> L ₄	81881	38% (5/13)	8 (0–75)
<i>Taenia</i> sp.	81882	8% (1/13)	<1 (0–3)
<i>Toxascaris leonina</i> L ₄	81883	8% (1/13)	<1 (0–1)
<i>Toxocara cati</i>	81884	92% (12/13)	13 (0–46)

Discussion

The results from the 13 untreated control cats reveal 10 species of helminths, including 1 *Molineus barbatus*, which has not been reported previously from this host. Of the 13 control animals, 7 had natural infections of adult *M. barbatus*. *Molineus barbatus* is a trichostrongylid parasite commonly found in the small intestine of raccoons (Chandler, 1942; Harkema and Miller, 1964) and bobcats (Miller and Harkema, 1968; Watson et al., 1981). In addition, it has also been observed once from the cougar (Forrester et al., 1985) and skunk (Babero, 1960). To our knowledge, it has never been reported from domestic cats. Significantly, this species was fourth in prevalence after *Toxocara cati*, *Ancylostoma tubaeforme*, and *Capillaria* sp. based on necropsy results.

The finding of these trichostrongylid worms in the intestines of cats is more than just of zoological interest. The eggs of *M. barbatus* are similar to those of cat hookworms such as *Ancylostoma tubaeforme* in shape (both are thin-shelled and elliptical) and size (both are 60 × 40 μm). In fact, we are not at all confident that we did not observe trichostrongyle eggs in the cat feces, but because they look so similar to hookworm eggs they may have been mistaken as such. More important than confusing the outcome of an anthelmintic trial is the possibility that cats

observed passing these eggs may be considered hookworm positive by practitioners and thus made to undergo expensive and sometimes dangerous treatment for worms they might not have.

These studies indicate that *M. barbatus* may be a common parasite of cats in Arkansas. This trichostrongylid is more generally known as a parasite of raccoons, but it was reported to be a common component of the helminth fauna of bobcats in the southeastern United States (Watson et al., 1981). Thus, it is no surprise that domestic cats may also become infected. Although the infective stages of trichostrongyles are usually ingested, Gupta's (1961) study of the life cycle of *M. barbatus* showed that the infective stage of this species is also capable of skin penetration. This may be a more likely explanation of how carnivores become infected.

Acknowledgments

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Figures 1–4. Adult male and female *Molineus barbatus* from naturally infected domestic cats. 1. Anterior end showing the transversely striated anterior swelling and the cervical groove with the excretory pore surrounded by liplike swellings. 2. Posterior end of male showing the spicules and gubernaculum. 3. Copulatory bursa showing the characteristic spines. 4. Posterior end of the female with characteristic spine. All scale bars = 75 μm.

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